

THE MAGIC OF WONDERING

Building Understanding Through Online Inquiry

Julie Coiro

Ask any teacher to describe what he or she sees among students who are engaged and motivated while reading, and you'll hear stories about children who are curious, interested, goal-directed, and eager to talk with and show others what they've learned. Not surprisingly, these observations are also supported by research that characterizes engaged readers as those who ask questions (Tovani, 2000; Wilhelm, 2007), actively explore and make predictions about personally relevant ideas (Buehl, 2014; Burke, 2014), and share their learning with authentic audiences in ways that make them feel important, successful, and like what they've done actually matters to someone else (Azzam, 2014; Pink, 2011).

The ability to ask questions, in particular, is essential to learning, reasoning, and understanding (Ram, 1991). As Dewey (1997/1938) proposed almost a century ago, when curriculum is built around learner instincts to talk, investigate, construct meaning, and express new discoveries with others, meaningful and transformative learning happens quite naturally. More recently, Harvey and Daniels (2009) reminded us, "Teachers in classrooms that nurture curiosity create an irresistible urge to wonder" (p. 94). In this column, I introduce a sequence of activities that incorporate the use of digital images and online texts into intentional opportunities for even the youngest learners to work with teachers as "partners in inquiry" (Casey & Bruce, 2011) as they wonder, anticipate, explore, and think deeply about things that matter to them.

Three Digital Opportunities to Wonder and Think Deeply

Mystery Photos

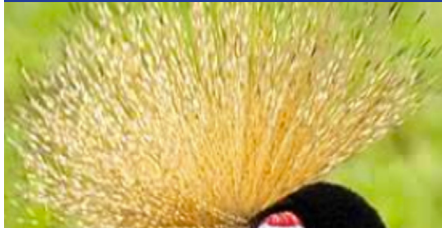
One of the simplest ways to prompt wondering and curiosity among learners of any age begins with an activity I call Mystery Photos. For this activity, find a digital photograph of an interesting animal or object; it could be just for fun or something related to a topic you will be studying next in your curriculum. Take a screenshot of a small portion of the photograph, revealing key features but not enough to give away what the object is (see Figure 1), and place it on a PowerPoint slide or a digital whiteboard projected to the class. Ask students to look at the smaller photo and think about what the image might be. Then, ask them to discuss what evidence in the picture makes them think that. This gives students an authentic opportunity to orally express their thinking while using picture cues as a first step toward later using evidence in writing to support their reasoning (see Common Core State Standards, National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

After students have had time to talk about their informed guesses, you can reveal the whole photo or

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Figure 1 Partial Image of a Crowned Crane Used as a Mystery Photo



have students visit a website like Jigzone (jigzone.com) to assemble a puzzle of this mystery photo and discover the answer to “What is this?” all by themselves. Jigzone is an online gallery of digital jigsaw puzzles appropriate for all ages with puzzle sizes from 6 to 247 pieces. You can upload your own photos to turn into puzzles, send a puzzle postcard to student e-mail accounts, or embed the puzzles into your own classroom website or blog. Themed categories such as art, animals, flowers, holidays, ocean life, transportation, and travel organize puzzles that can spark curiosity related to many elementary-level curricular themes.

Just a few of many other online sources for mystery photos to spark children’s curiosity include the Ugly Bug Contest (www.uglybug.org), Pics4Learning (pics.tech4learning.com), the Name That Food Flickr group (www.flickr.com/groups/namethatfood/), Journey North for Kids (www.learner.org/jnorth/KidsJourneyNorth.html) and the Nanoworld Image Gallery (www.xtalent.com.au/gallery/index.php?cat=3).

Once you choose the mystery photo, you can then locate a few resources for students to explore to inspire or address additional questions about the object in the photograph. While exploring these resources, students become intrigued by this mystery object and want to read, watch, and talk about what they’ve learned with their classmates. These literacy practices, in turn, foster excitement, collaboration, deeper learning,

and feelings of self-efficacy and success in their classroom community.

In one classroom, for instance, after students correctly assembled the interactive puzzle from which a smaller image was taken (see Figure 1), they learned the mystery photo showed the crown feathers on the head of a crowned crane (see Figure 2 and the completed puzzle at www.jigzone.com/puzzles/C3055D567D1B). After seeing the full picture of a crowned crane, students met in small groups to develop some interesting questions they would like to ask to learn more about this animal. Then they were given time to read information about the crowned crane from the San Diego Zoo’s Safari Park Website (<http://www.sdzsafari.org/wildlife/crowned-crane>). For students who had difficulty decoding all of the words, a text-to-speech tool made this text easily accessible for all learners.

Once students get accustomed to the way this game works, it doesn’t take long before they want to design their own mystery photo activities to keep others wondering. For example, first graders at Bowen School composed a Look Close Riddle Book using mystery photos in Voicethread (goo.gl/EUrihe), inspired by Peter Ziebel’s book *Look Closer!* Teachers have also created their own digital models to spark children’s curiosity; examples include the Voicethread “What could this be?” (goo.gl/KkRIsh) and this compilation of mystery photos around bugs children were examining under the microscope (goo.gl/v5tI3e).

This type of wondering activity can also be adapted for older students by presenting a photograph containing a discrepant event, or information that conflicts with students’ prior knowledge, to create a state of perplexity (see Ciardiello, 2003). In turn, “the learner is prompted to search for questions that can guide him or her in the quest to resolve

the discrepancy” (p. 229). For instance, you might present students with a perplexing scenario via video clip or photograph and ask them to respond to questions such as “What if...?” or “What do you think happened?” Similarly, you might engage students with an interactive game such as GeoGame (www.earth-pics.com/geo-game/) that uses maps and landmarks to inspire questions and exploring to help players determine their location in the world.

Eventually, you can have students transition into trying to figure out what happened in a certain situation using a set of textual clues (rather than picture clues) such as those provided in the series of 157 mystery brain teasers at Braingle (see www.braingle.com/Mystery.html). Inquiry and wondering then lead directly to opportunities for learners to grapple with graphical and textual clues while practicing comprehension strategies such as inferencing, predicting, connecting, analyzing, and monitoring understanding.

Internet Inquiry Baskets

Once students realize the power of interesting questions, you can continue building a culture of inquiry and wondering in your classroom with Internet inquiry baskets. Here, children write down their questions on index cards, one on each card, and put the cards into

Figure 2 Full Image of a Crowned Crane Used as a Mystery Photo



a special basket. These questions might be sparked by something students read, by a classroom activity, or by something that happened outside of the classroom earlier that day. At the end of the week (or lesson), the teacher selects a card and question, does some individual research outside of class to find information about this question, and comes back to school ready to share steps taken to answer the question.

The point of this activity is not just to send students to the answers; it's much more about modeling and thinking aloud about the strategies used to generate interesting questions, access search engines, navigate through websites, and decide which information is most relevant and appropriate for answering the question. For example, it would be useful to make note of keywords you used, search strategies that worked best, how certain menus guided you through a website, and steps you took to avoid excess advertising or other distractions. You would also notice and record the website title, website address, and website author and/or sponsor—important distinctions to label and model as children begin referring to websites they locate in their own search for answers.

When you return to class, you can walk students through your searching and navigating processes, thinking aloud about the challenges you faced and strategies you used to overcome them. Even good readers find the Internet challenging at times, so modeling persistence and problem solving are important parts of online inquiry. In addition, using vocabulary associated with online reading (e.g., *search engine*, *website*, *menu*, *hyperlink*, *URL*) as a natural part of your classroom talk helps build an important metalanguage around web-based inquiry processes—much the same way that we introduce children to vocabulary associated with printed books (e.g., *cover*,

“Intentional opportunities to capitalize on the natural sense of curiosity that lies within each of our students are the essence of what drives learning forward.”

title page, *table of contents*, *index*) to foster their ability to talk about and use books as part of their literacy practices. Young readers should have many opportunities to hear how new terms associated with digital spaces are used to describe everyday online literacy experiences. (For more on think-alouds and guided conversations about online reading practices, see Coiro & Putman's [2014] ideas for teaching students to self-regulate during online inquiry.)

After the teacher models a lesson for the whole class, relevant websites can be set up in reading and writing centers for students to visit throughout the day to explore information related to the student's question. Finally, the child who asked the original question also spends time meeting with an adult or peer helper to type up what she learned. The child adds her photo, and her page is published and shared with her classmates, with teachers in the school, with parents at home, or in the local public library. Even at a young age, children can start to practice important online reading skills like questioning, locating, evaluating, and composing digital texts while participating in and contributing to their literacy community. Most importantly, they begin to learn that their questions are important and that questions can drive more learning, more opportunities to talk and share, and in turn, more questions to read and explore.

To illustrate what this looks like in practice, I share an experience I had in Mrs. Peterson's kindergarten classroom

a few years ago. Initially, the class was enjoying a read-aloud about the legend of George Washington chopping down his father's favorite cherry tree just as the spring blossoms were starting to appear. One little girl, Justine, wondered aloud, “But what do cherry blossoms actually look like?” Mrs. Peterson acknowledged Justine's interesting question and encouraged her to share it in the Internet inquiry basket. After school, the teacher spent about 30 minutes locating several websites with age-appropriate information to extend her students' thinking about Justine's question in a variety of ways.

The next morning, Mrs. Peterson gathered her class together for a large group think-aloud about how she used the KidsClick search engine (www.kidsclick.org) to locate and navigate websites to videos, images, and texts related to Justine's question. This was followed by center work as small groups of children pored over online photo galleries of cherry blossoms, a festival video, and live webcam views of cherry blossom trees in Washington, DC (see <http://www.nps.gov/cherry/cherry-blossom-bloom.htm>), and used the images to sketch and color pictures of cherry blossoms in various stages of bloom. In another part of the room, children enjoyed a parent reading aloud from a website with Alton Chung's retelling of *The Old Man Who Made the Trees Blossom*, a Japanese folktale about cherry trees (see spiritoftrees.org/the-old-man-who-made-the-trees-blossom) and discussed the story's theme of kindness.

Later that day, Justine met with the same parent volunteer and dictated what she learned about her question, selected website photos she thought best represented her ideas, and proudly published her work as a page in her class's Internet inquiry journal (see Figure 3). A copy of the journal was also kept in the school

library so other students and teachers could enjoy Justine's (and other children's) new discoveries over time.

Wondering Notebooks and Inquiry Buddies

A third activity designed to build a culture of wondering across grade levels

also addresses concerns about what to do with leftover questions in each week's Internet inquiry basket. Over time, students are gradually encouraged to log their wonderings and subsequent findings into a personal Wondering Notebook they keep with them during reading groups or free reading time. Then, much like cross-grade buddies who are paired together to read books to and with each other, cross-grade inquiry buddy meetings provide time for children to exchange questions and ideas from their wondering notebooks.

Buddies can gather around a laptop or iPad to share interesting sources they've uncovered in their inquiries, or buddies can even be paired up to inspire each other's wonderings. Third graders asked to create science reports on animals, for example, might ask their kindergarten partner class to generate questions they have about animals. Then, each third grader selects one of the kindergartners' questions to inspire his or her study of a particular animal. Natural wonderings such as "Why do frogs have long tongues?" or "Why do dogs shed their fur?" can be incorporated into the third graders' online inquiry projects, and answers are exchanged when each third grader meets with his or her inquiry buddy a week or two later. Partners can share what they learned and exchange interesting digital resources they located while also describing useful and not-so-useful strategies for different steps in the process.

Conclusion

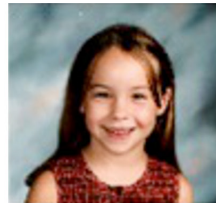
I believe these intentional opportunities to capitalize on the natural sense of curiosity that lies within each of our students are the essence of what drives learning forward. All three sets of practices—setting out inquiry baskets to remind students that their questions

Figure 3 Justine's Cherry Blossom Inquiry Contribution to Class Journal

What do cherry blossom trees look like? (by Justine)

We used the Internet to find out:

Cherry blossoms are pink and white. There are a lot of cherry blossom trees in Washington, D.C.



We learned that cherry blossom buds grow in different stages.



are important; using interesting images, texts, and discrepant events to inspire new questions; and making time for students to talk more about their wonderings with teachers or an inquiry buddy—create space for learners of all ages to actively engage in the beginning stages of inquiry while enhancing skills in reading comprehension, critical thinking, and digital literacy. Helping students learn to satisfy their own curiosities gradually empowers them to tackle the complex problems they will face in our rapidly changing digital world.

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